عنوان مقاله:

Machine Reliability in a Dynamic Cellular Manufacturing System: A Comprehensive Approach to a Cell Layout Problem

محل انتشار:

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خلاصه مقاله:

The fundamental function of a cellular manufacturing system (CMS) is based on the definition and recognition of a type of similarity among parts that should be produced in a planning period. Cell formation (CF) and cell layout design are two important steps in implementation of the CMS. This paper represents a new nonlinear mathematical programming model for dynamic cell formation that employs the rectilinear distance notion to determine the layout in the continuous space. In the proposed model, machines are considered unreliable with a stochastic time between failures. The objective function calculates the costs of inter- and intra-cell movements of parts and the cost due to the existence of exceptional elements (EEs), cell reconfigurations, and machine breakdowns. Due to the problem's complexity, the presented mathematical model is categorized in NP-hardness; thus, a genetic algorithm (GA) is used for solving this problem. Several crossover and mutation strategies are adjusted for GA and parameters are calibrated based on Taguchi experimental design method. The great efficiency of the proposed GA is then demonstrated by drawing a comparison between particle swarm optimization (PSO) and the optimum solution via GAMS considering ..several small/medium- and large-sized problems

کلمات کلیدی:

Cellular manufacturing system; Cell formation; Cell layout; Machine reliability; Meta-heuristic algorithms